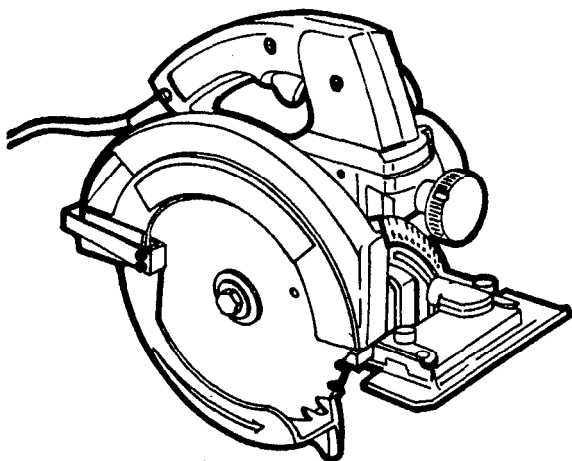


CHAPTER 52 ELECTRICAL POWER TOOLS

HOW TO CHOOSE AND USE THEM

The "Types and Uses" pages provide you with a list of the electrical power tools found in the pioneer tool outfit. These pages should help you select the right power tool for the job. The "Using" pages tell you how to best use these tools. By becoming familiar with these procedures, you will build a good background for further skill development in the use of power tools. The "Care" pages tell you how to keep your power tools in proper working condition. The "Safety" page tells you how to use your power tools safely and wisely.

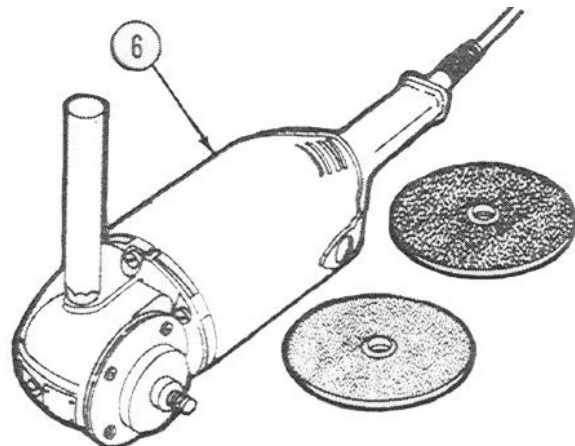
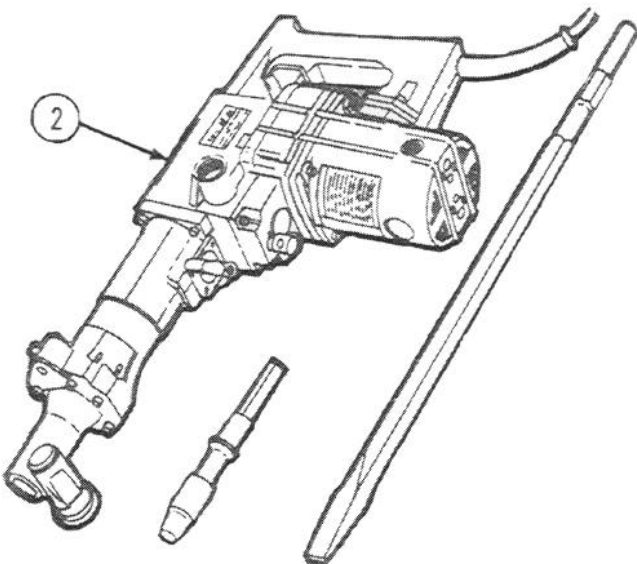
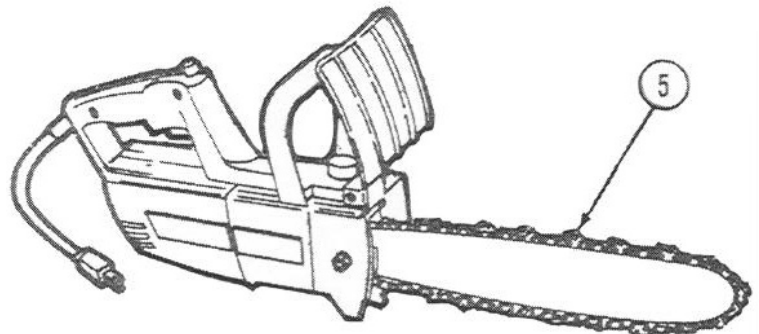
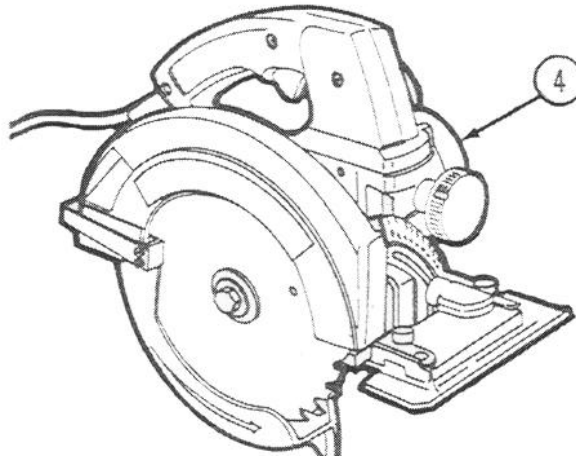
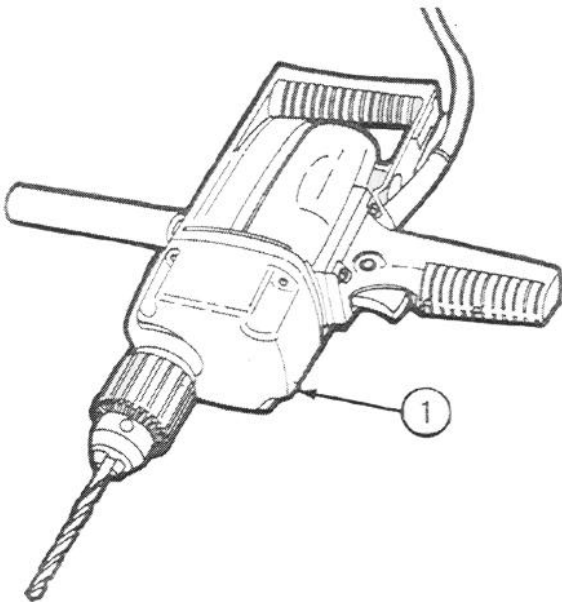
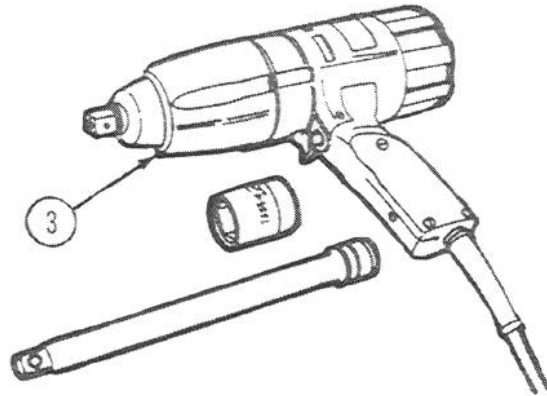


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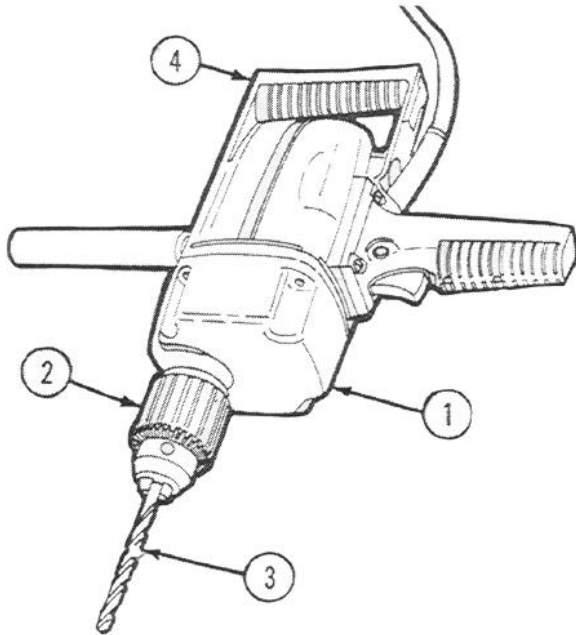
TYPES AND USES

Portable electric power tools are designed for a wide variety of uses including construction, tree cutting, bridging, or tree clearing. Electric power tools increase production and reduce time and manpower. Although there are many varieties of electric power tools, only those tools contained in the pioneer tool outfit will be covered in this chapter. They are the electric drill (1), hammer (2) impact wrench (3), circular saw (4) chain saw (5) sander (6), and accessories for these tools. For additional information on power tools not covered in this chapter, refer to FM 9-24.



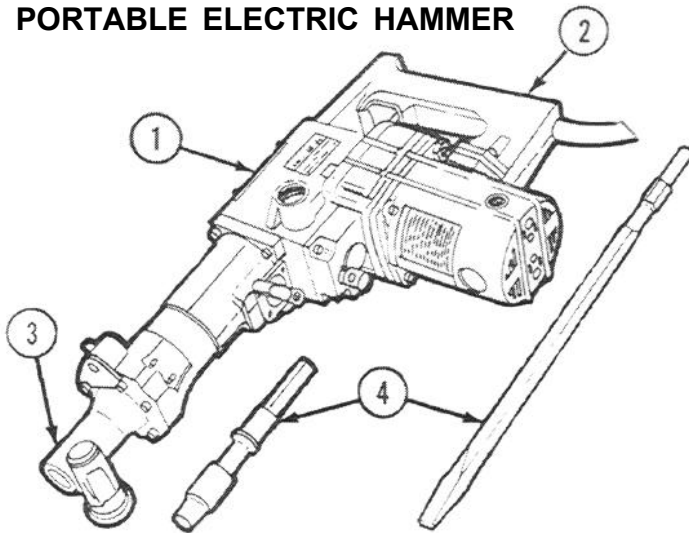
TYPES AND USES - Continued

PORTABLE ELECTRIC DRILL



The portable electric drill is basically an electric motor in a metal housing (1). The housing is fitted with a "chuck" (2) into which a bit (3) or other attachment can be inserted. The portable electric drill, although varying in size and design, usually has either a spade or pistol-grip handle (4). The portable electric drill is basically designed for drilling. However, by adding various accessories it can be adapted for different jobs. Sanding, sawing, buffing, and polishing are examples of possible uses.

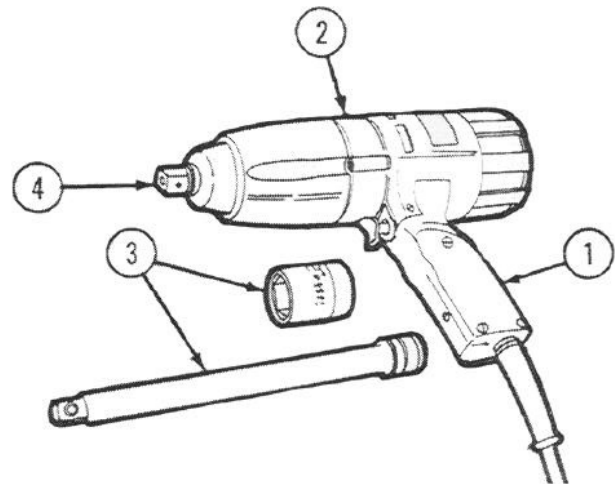
PORTABLE ELECTRIC HAMMER



The portable electric hammer consists of a metal housing (1) with a spade or pistol-grip handle (2).

A strong spring inside the housing moves a steel piston back and forth in a pounding motion. The housing muzzle (3) is designed to hold a variety of bits (4) which give the electric hammer great versatility. Examples of possible uses for this tool are beveling, caulking, pounding, digging, and breaking operations.

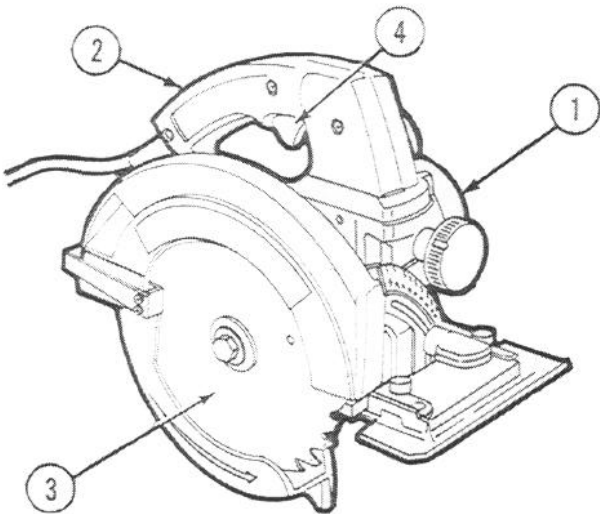
ELECTRIC IMPACT WRENCH



The portable electric impact wrench consists of a pistol-grip handle (1) on a metal housing (2) which contains a motor that energizes the driving-anvil inside the muzzle of the housing. Attachments (3) are fastened to the driving-anvil by snapping them onto the socket retainer (4). The portable electric wrench with its accompanying equipment is primarily intended for applying and removing nuts, bolts, and screws. It may also be used to drill and tap wood, metal, plastics, etc., and to drive and remove socket head or self-tapping screws.

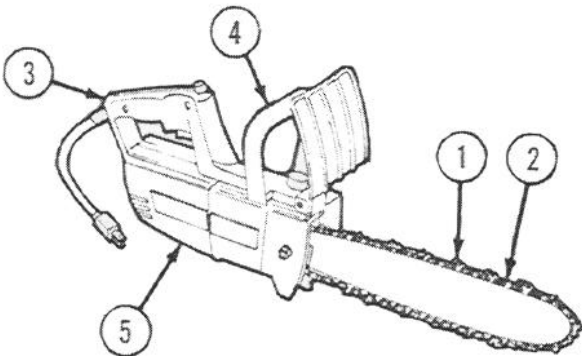
TYPES AND USES - Continued

PORTABLE ELECTRIC CIRCULAR SAW



The portable electric circular saw consists of a sturdy motor in a metal housing (1), a pistol-grip handle (2), and a circular saw blade (3). The trigger switch (4) is built into the handle. Saws vary in size and design depending on the nature of the task. There are many applications for this tool. Typical uses would be cutting studding to length, cutting off end boards, preparing trim, or ripping boards and planks.

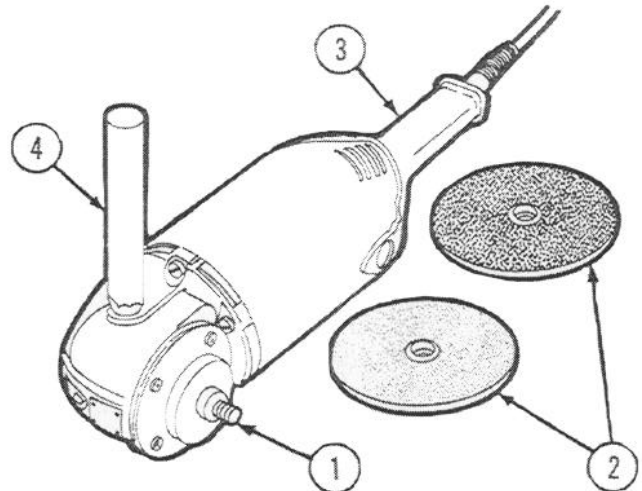
ELECTRIC CHAIN SAW



The electrically driven chain saw is a portable power saw with the teeth (1) arranged on a flexible steel chain-like belt (2). It has a pistol-like grip (3) and bar frame (4) above the motor housing (5) for holding and

guiding. Unlike the gasoline-powered chain saw, the electric chain saw is designed for lighter work such as tree trimming and cutting small logs and timber.

PORTABLE ELECTRIC DISK SANDER



The portable electric disk sander is an electrically driven tool with a spindle (1) at the front end for holding circular attachments (2). Various types of attachments can be fastened to the end of the projecting spindle. The rear end of the sander's housing tapers to form a guiding handle (3). To provide additional control, a second handle (4) is attached to the side of the housing. The portable electric disk sander with its many attachments can be used for a variety of tasks. Heavy-duty sanding, grinding, wire brushing, buffing, and planing are some of the possible applications.

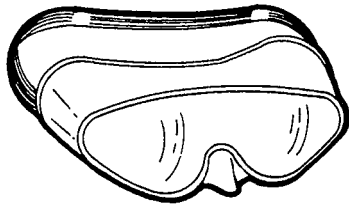
SAFETY

Before operating any power tool, refer to Chapter 2, Section II for safety guidelines to observe when using these tools.

USING THE PORTABLE ELECTRIC DRILL

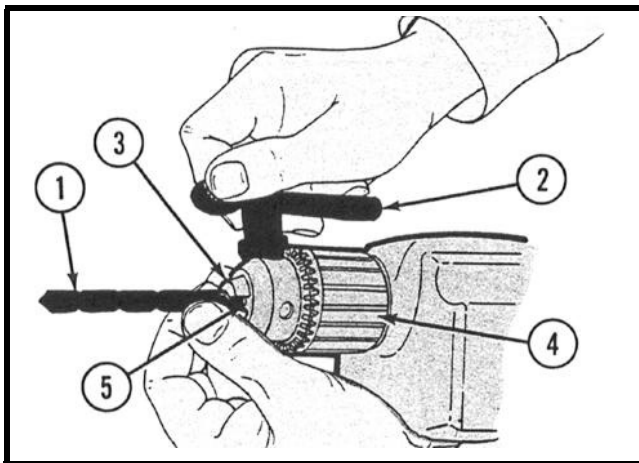
WARNING

BEFORE USING ANY ELECTRICAL TOOL, ALWAYS MAKE CERTAIN THE TOOL IS EQUIPPED WITH PROPER GROUNDING FEATURES. FAILURE TO HAVE PROPER GROUNDING CAN RESULT IN SERIOUS SHOCK.



WARNING

ALWAYS WEAR PROPER EYE PROTECTION WHEN WORKING WHERE FLYING PARTICLES MAY CAUSE EYE INJURY.

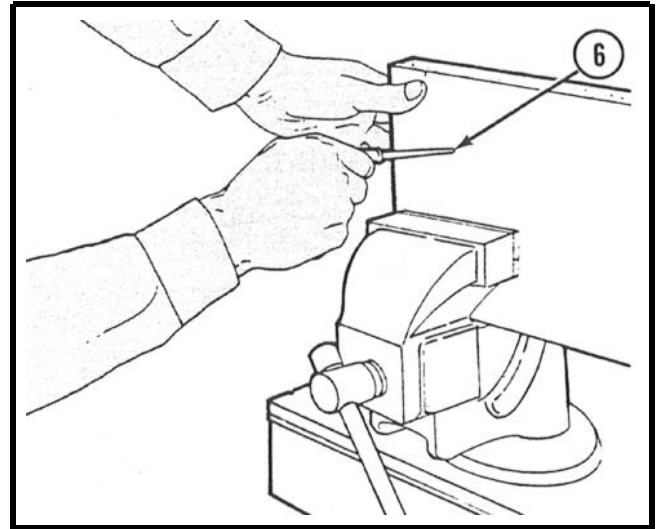


- 1 Select the proper bit (1) required for the task.

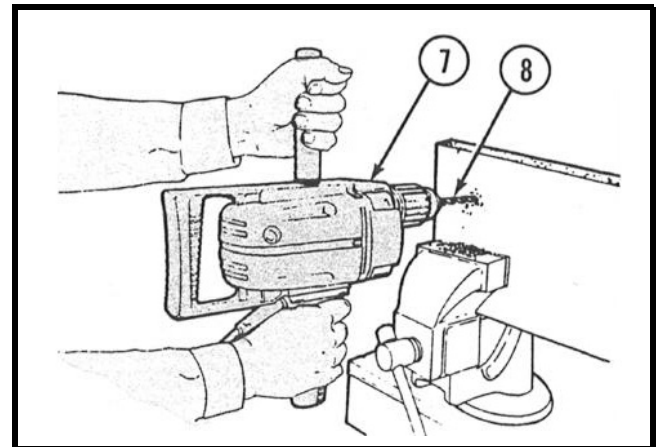
NOTE

To turn chuck key in either direction a firm grasp of the chuck is required.

- 2 Fit the chuck key (2) into the side adjusting hole between jaws (3) and chuck (4) and turn the key counterclockwise until the chuck opens enough to admit the bit shank (5).
- 3 Insert the bit and center the shank in the chuck jaws. Tighten jaws securely by turning the chuck key clockwise.
- 4 Remove chuck key and store where key will not get lost.



- 5 Before drilling, make sure that the work is stationary or firmly secured.
- 6 Using a punch or awl, make a small prick point (6) in the spot where the hole will be made. (This will prevent the drill bit from bouncing or slipping away from the spot where the hole is to be drilled.)

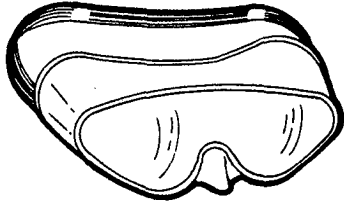


- 7 Connect electric drill (7) to power source. Place the drill bit on the marked spot and depress trigger switch. Begin drilling, exerting firm but even pressure to keep the bit cutting.
- 8 Withdraw the bit frequently from the work to clean chips from the bit flutes (8) and to allow the bit to cool.
- 9 Ease upon the drill pressure as the bit approaches the other side of the work surface.
- 10 After hole is completed, carefully withdraw rotating drill bit to prevent binding or breaking. Release trigger switch.

USING THE PORTABLE ELECTRIC HAMMER

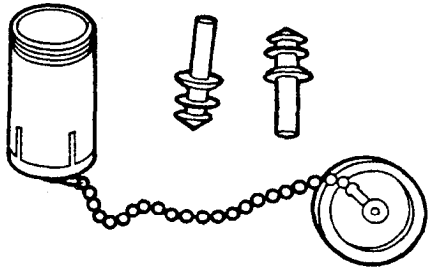
WARNING

BEFORE USING ANY ELECTRICAL TOOL, ALWAYS MAKE CERTAIN THE TOOL IS EQUIPPED WITH PROPER GROUNDING FEATURES. FAILURE TO HAVE PROPER GROUNDING CAN RESULT IN SERIOUS SHOCK.



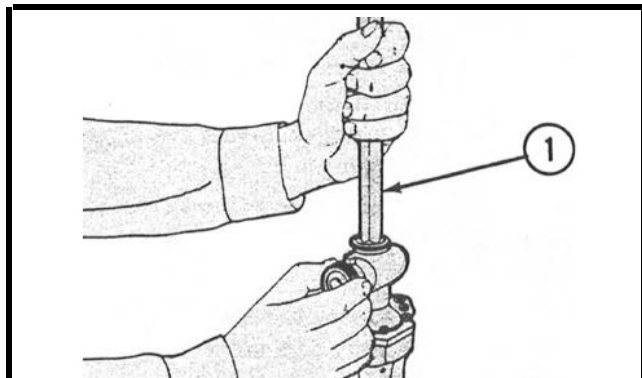
WARNING

ALWAYS WEAR PROPER EYE PROTECTION WHEN WORKING WHERE FLYING PARTICLES CAN CAUSE EYE INJURY.

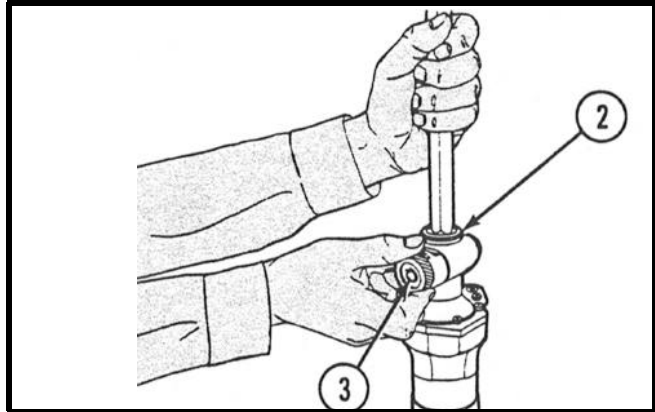


WARNING

THE ELECTRIC HAMMER PRODUCES HAZARDOUS NOISE LEVELS WHEN IN OPERATION. ALWAYS WEAR PROPER PROTECTION TO AVOID POSSIBLE HEARING LOSS.



- 1 Select the correct attachment (1) required for the task.



- 2 Insert attachment into bit retainer (2), and secure in place with locking collar (3).

CAUTION

TO PREVENT UNNECESSARY WEAR OF PRECISION PARTS AND COMPONENTS, PLACE BIT AGAINST WORK SURFACE BEFORE OPERATING SWITCH.

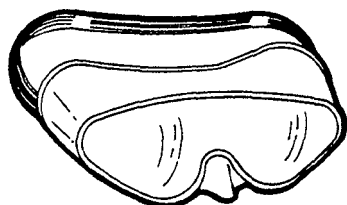


- 3 Connect hammer (4) to power source and depress handle trigger.
- 4 Apply only enough pressure to keep the bit in contact with working surface.
- 5 Occasionally stop the hammer and clear dust or other residue from the working surface.

USING THE IMPACT WRENCH

WARNING

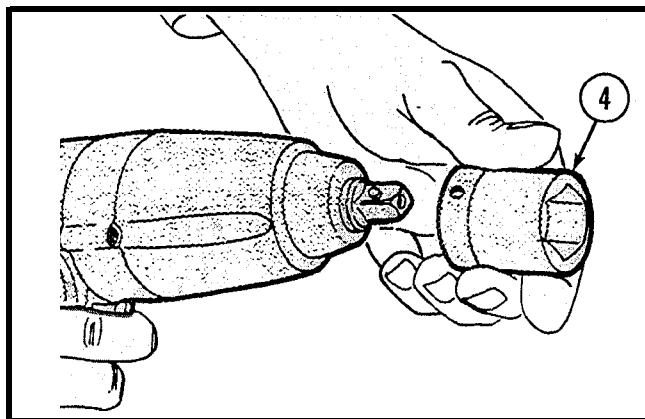
BEFORE USING ANY ELECTRICAL TOOL, ALWAYS MAKE CERTAIN THE TOOL IS EQUIPPED WITH PROPER GROUNDING FEATURES. FAILURE TO HAVE PROPER GROUNDING CAN RESULT IN SERIOUS SHOCK.



WARNING

ALWAYS WEAR PROPER EYE PROTECTION WHEN WORKING WHERE FLYING PARTICLES CAN CAUSE EYE INJURY.

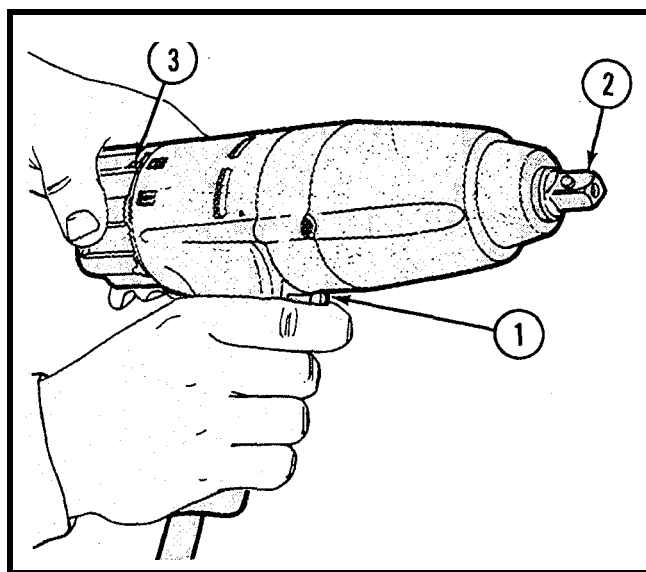
- 4 Start the wrench again making sure the driving anvil is now rotating in the opposite direction.
- 5 Repeat steps 2 through 4 several times to make sure the wrench is reversing consistently.
- 6 Disconnect impact wrench from power source.
- 7 Replace the wrench if it does not perform in the above manner.



WARNING

DO NOT USE STANDARD SOCKETS WITH ANY IMPACT TOOL. THEY CAN SHATTER CAUSING SERIOUS INJURY AND/OR DAMAGE TO THE EQUIPMENT.

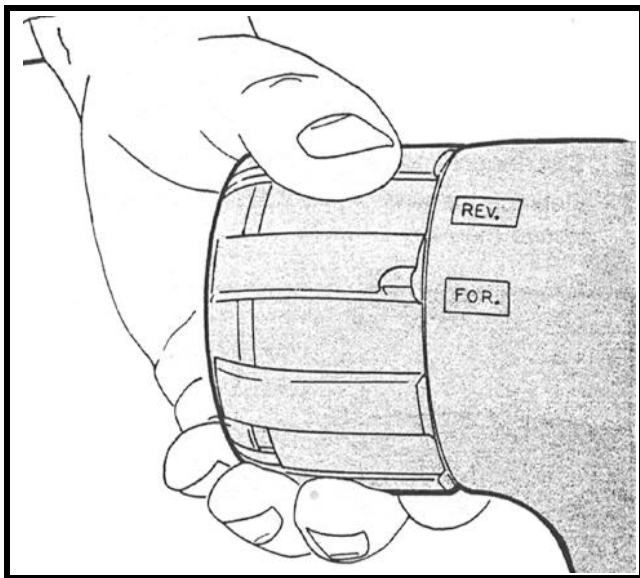
- 8 Select the proper attachment (4) and secure it in place on the driving anvil.



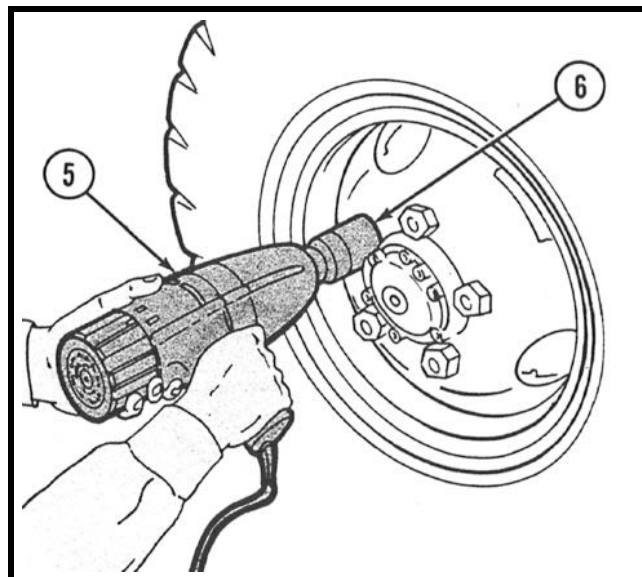
Before start of work make sure impact wrench and its reversible features are functioning properly in the following manner:

- 1 Connect cord to power source.
- 2 Depress trigger (1) and note the rotating direction of the driving anvil (2).
- 3 Stop the wrench and adjust the ratchet switch (3) to reverse the direction.

USING THE IMPACT WRENCH - Continued



- 9 Set the ratchet switch in desired position for anvil rotation required. Reconnect impact wrench to power source.

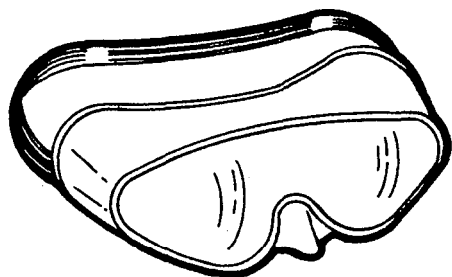


- 10 Using both hands, place impact wrench (5) on work surface (6) and depress trigger.
- 11 Continue operation until work is completed. Release trigger to stop wrench.

USING THE PORTABLE ELECTRIC CIRCULAR SAW

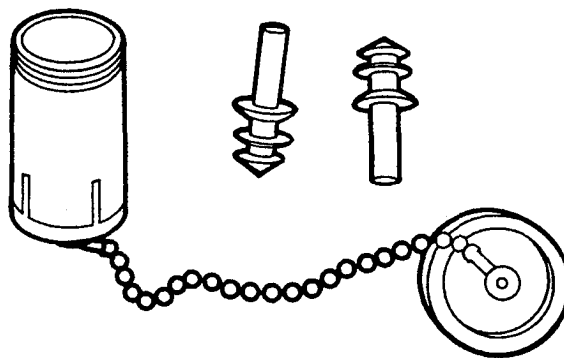
WARNING

BEFORE USING ANY ELECTRICAL TOOL, ALWAYS MAKE CERTAIN THE TOOL IS EQUIPPED WITH PROPER GROUNDING FEATURES. FAILURE TO HAVE PROPER GROUNDING CAN RESULT IN SERIOUS SHOCK.



WARNING

ALWAYS WEAR PROPER EYE PROTECTION WHEN WORKING WHERE FLYING PARTICLES CAN CAUSE EYE INJURY.

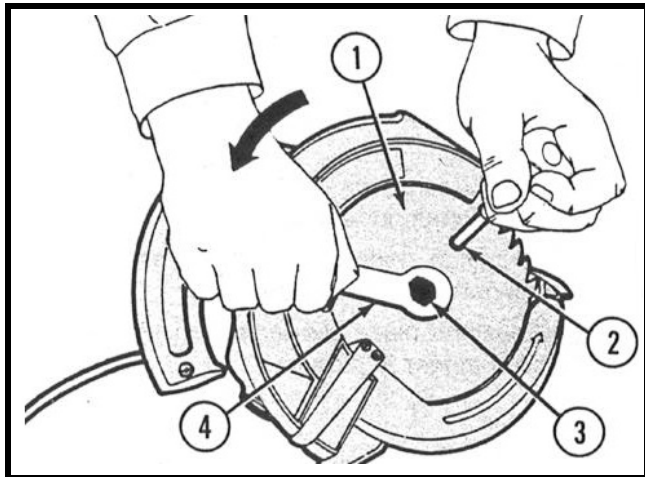


WARNING

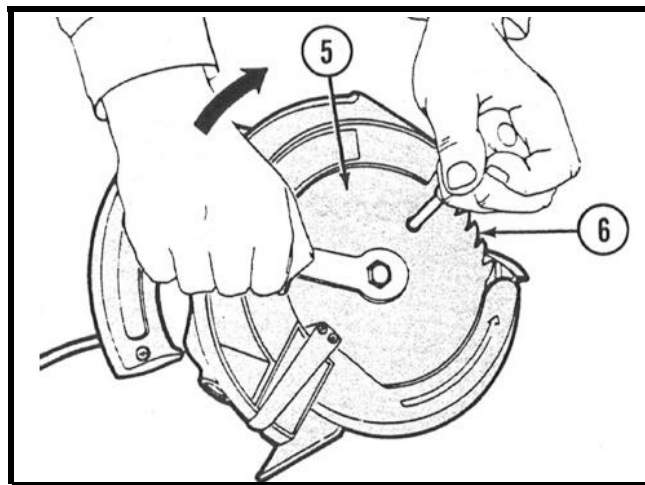
THE ELECTRIC CIRCULAR SAW PRODUCES HIGH NOISE LEVELS WHEN IN OPERATION. ALWAYS WEAR PROPER PROTECTION TO AVOID POSSIBLE HEARING LOSS.

USING THE PORTABLE ELECTRIC CIRCULAR SAW - Continued

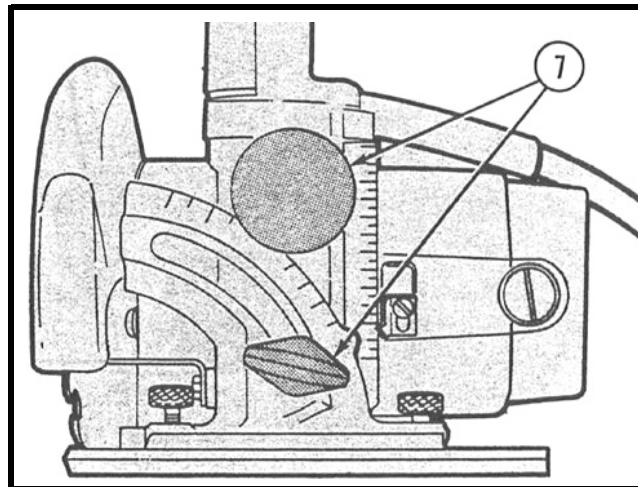
Select the proper saw blade for the task and attach as follows:



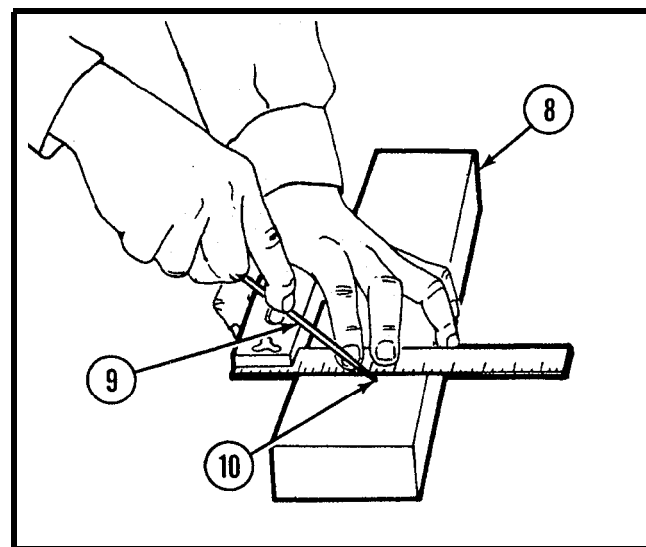
- 1 Make sure power to saw is disconnected.
- 2 To change saw blades, lock the old blade (1) on the saw by inserting a punch, screwdriver, nail, etc., in blade hole (2) provided.
- 3 Remove the old blade by removing the saw clamp screw and flange (3) using wrench (4) provided. Turn the wrench counterclockwise to loosen blade.



- 4 Install new saw blade (5) on saw, and make sure teeth (6) are in the correct cutting direction (upwards toward saw).
- 5 Tighten clamp and flange screw by turning wrench clockwise.

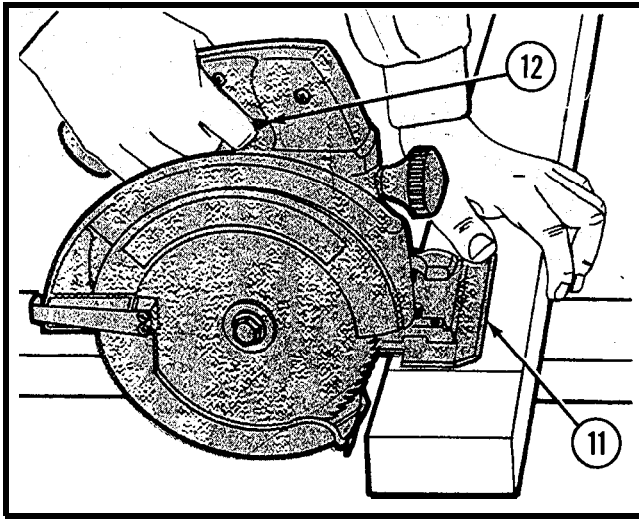


- 6 Set the saw's guides (7) to the correct angle and depth of the cut required.



- 7 Make sure the work (8) to be cut is firmly secured to prevent slippage or movement.
- 8 With a marking instrument (9) such as a pencil, pen, scribe, etc., draw a straight line (10) across the work surface to act as a guide for the saw blade to follow.

USING THE PORTABLE ELECTRIC CIRCULAR SAW - Continued



CAUTION

The saw blade must be revolving at full speed before it contacts the work surface.

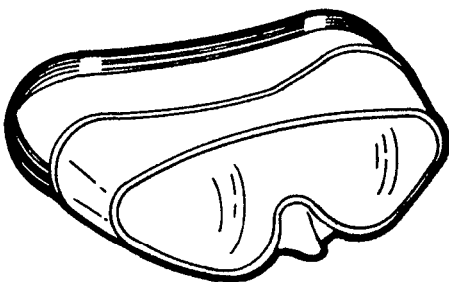
- 10 Depress handle trigger (12) to start saw and follow guideline made in step 8.
- 11 When cutting, apply firm, steady pressure. Be careful not to force the saw.
- 12 Continue until blade has completed the entire cut. Release trigger to stop saw.

- 9 Connect circular saw to power source and place sole plate (11) on work surface.

USING THE ELECTRIC CHAIN SAW

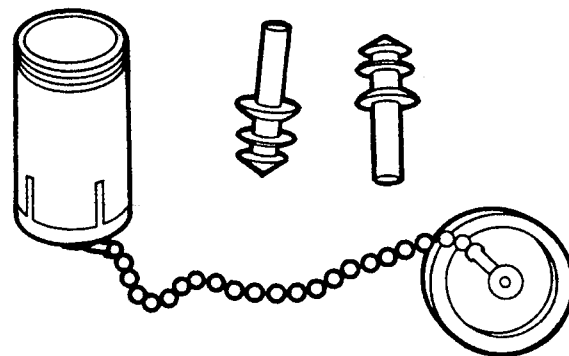
WARNING

BEFORE USING ANY ELECTRICAL TOOL, ALWAYS MAKE CERTAIN THE TOOL IS EQUIPPED WITH PROPER GROUNDING FEATURES. FAILURE TO HAVE PROPER GROUNDING CAN RESULT IN SERIOUS SHOCK.



WARNING

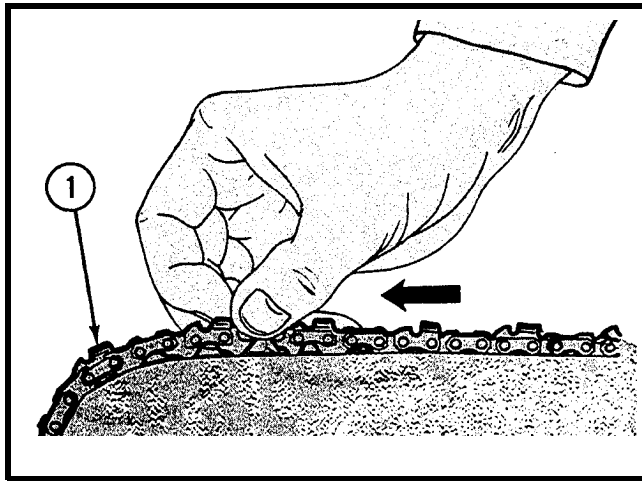
ALWAYS WEAR PROPER EYE PROTECTION WHEN WORKING WHERE FLYING PARTICLES CAN CAUSE EYE INJURY.



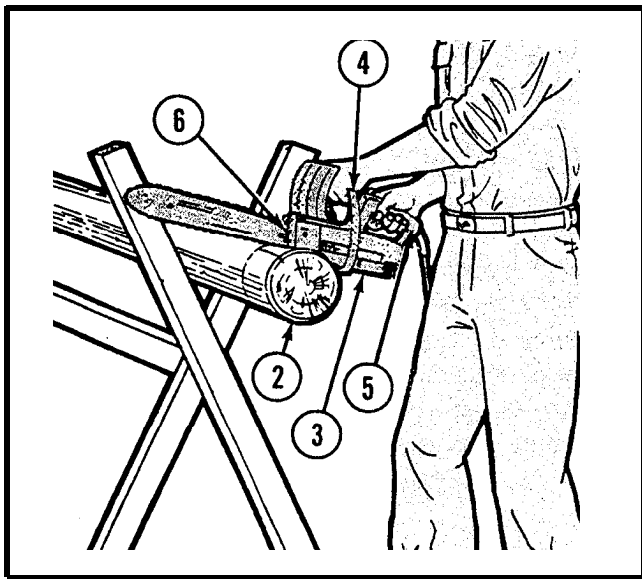
WARNING

THE ELECTRIC CHAIN SAW PRODUCES HAZARDOUS NOISE LEVELS WHEN IN OPERATION, ALWAYS WEAR PROPER PROTECTION TO AVOID POSSIBLE HEARING LOSS.

USING THE ELECTRIC CHAIN SAW - Continued



- 1 Make sure power source is disconnected. Before using, ensure that the chain teeth (1) are in the proper position (saw should cut in direction of arrow).
- 2 Check the teeth to make sure they are sharp and undamaged.



- 3 Ensure that the work (2) is stationary and well secured to prevent slippage or movement.
- 4 Connect chain saw to power source.

WARNING

NEVER STAND DIRECTLY BEHIND CHAIN SAW.

- 5 Stand to the left of the saw (3) with your left hand on the front handle (4) and your right hand on the rear handle (5).

NOTE

Reverse the position of the stance and hands if left-handed.

- 6 With your weight evenly distributed, depress trigger to start saw.

WARNING

WHEN CUTTING, KEEP THE NOSE OF THE GUIDE BAR FROM CONTACTING LOGS, BRANCHES, GROUND OR ANY OTHER OBSTRUCTION. THIS CAN CAUSE "KICKBACK" WHICH IS A QUICK AND DANGEROUS UPWARD MOVEMENT OF THE GUIDE BAR AND SAW CHAIN.

CAUTION

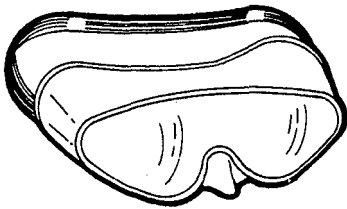
The saw chain should be at maximum speed before contacting working surface.

- 7 Cut with the spike bar (6) set firmly against the wood and apply light pressure.
- 8 Continue to guide the chain saw through the work until cut is completed.

USING THE PORTABLE ELECTRIC SANDER

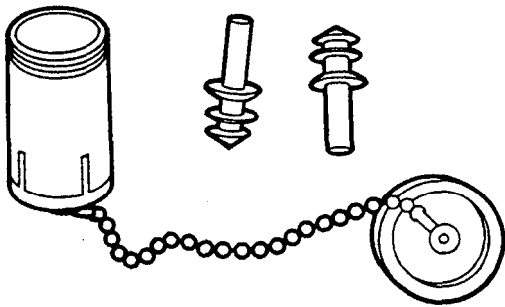
WARNING

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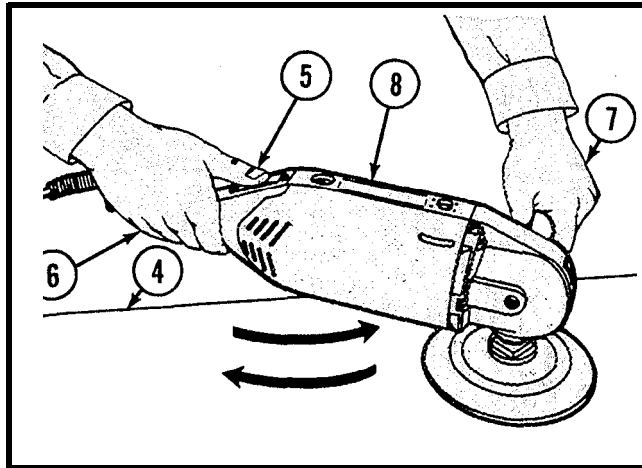
WARNING

ALWAYS WEAR PROPER EYE PROTECTION WHEN WORKING WHERE FLYING PARTICLES CAN CAUSE EYE INJURY.



WARNING

THE ELECTRIC SANDER PRODUCES HAZARDOUS NOISE LEVELS WHEN IN OPERATION. ALWAYS WEAR PROPER PROTECTION TO AVOID POSSIBLE HEARING LOSS.

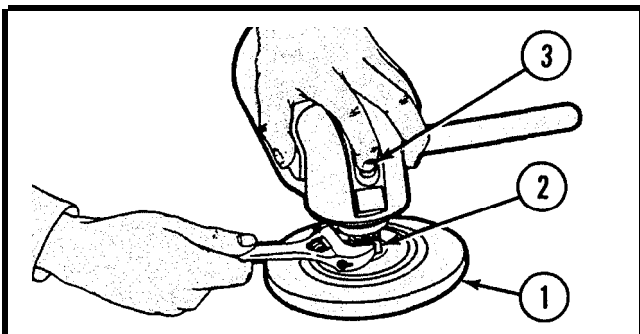


- 2 Make sure the work surface (4) is secured to prevent movement.
- 3 Connect sander to power source. Depress switch (5) on the sander so that the attachment is turning before placing it on the work surface.

CAUTION

Using excessive pressure will slow up the sanding action, clog the disk, and cause motor to overheat.

- 4 With one hand on each handle (6) and (7), begin sweeping the sander (8) back and forth across the work surface.
- 5 During operation, tilt the sander slightly so the entire disk does not contact the work surface.
- 6 Brush or clean the sanding dirt from the work surface frequently.
- 7 When finished, lift the sander from the work surface before turning off the switch.



- 1 Select the proper attachment (1) and secure it to the spindle (2) by depressing locking button (3) and tightening spindle as shown.

CARE OF ELECTRIC POWERTOOLS

In order to achieve and maintain maximum performance, all electrical power tools must be given proper care. The following is a list of guidelines that will help keep your power tools in a "ready to use" condition.

1. Keep all power tools, especially the housing intake and exhaust holes, clear and free of dust and dirt at all times.
2. Examine power tool cords for exposed loose wires and for damaged insulation.
3. Wipe power cords frequently to prevent deterioration from oil or grease.
4. Check cord plugs for loose prongs or cracked casings.
5. Never hold or drag electrical tools by the cord at any time.
6. To prevent rusting, apply a light coat of oil to cutting surfaces of tools.
7. Store power tools in properly designated containers' when not in use.

